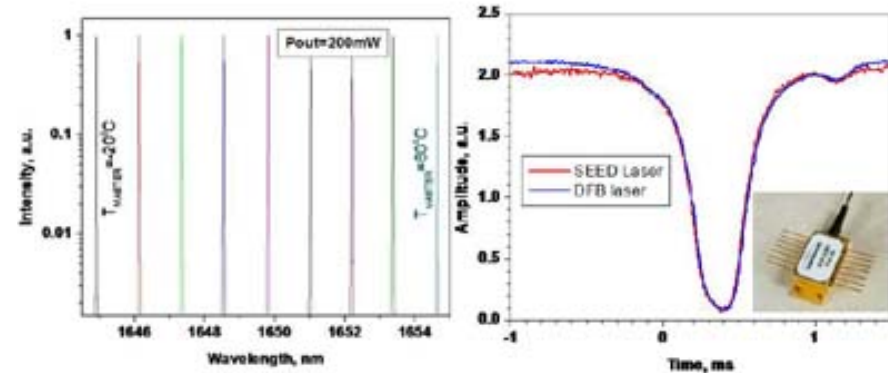


PI: Igor Kudryashov
Princeton Lightwave, Inc. - Cranbury, NJ

Identification and Significance of Innovation

We propose to develop a fiber-coupled robust tunable seed laser with an output power of >500 mW at 1651 nm. We will leverage initial work carried out at Princeton Lightwave Inc. in the development of injection locking technology, as well as an excellent legacy capability in the design and manufacturing of single-mode InGaAs/InP ridge waveguide (RWG) laser diodes (LD) to support a commercial product line based on these devices. We will dramatically improve the high-power performance of 1651 nm diode lasers



Coarse spectral position tuning of high power seed laser [left] and Methane absorption line: blue line - low power DFB laser; red line-170mW high power seed laser[right].

Estimated TRL at beginning and end of contract: (Begin: 3 End: 5)

Technical Objectives and Work Plan

Technical Objectives and Work Plan

- Develop an multidiscipline model for a high power FP RWG laser diode at injection locking
 - Develop based on selected in Phase I approaches epi-design and RWG geometry
 - Investigate potential solutions and select the best one for fast tuning in 0.3nm spectral range
 - Build and test tunable seed laser with output power >500mW in fiber
1. Develop optical, thermal and electrical model of a high power FP RWG LD at high current operation
 2. Experimental proof of calculation results
 3. Develop epi-design for single-mode RWG LD's, which can provide >500mW in fiber
 4. Selecting the optimal ridge geometry and lensed fiber design for efficient coupling
 5. Build a single-mode RWG laser diode module with >500mW in fiber
 6. Select and experimentally prove perspective fast tuning algorithm
 7. Design seed laser controller, which provides slow tuning i and fast tuning
 8. Build and proof performance of tunable seed laser with output power >500mW in fiber

NASA Applications

- LIDAR instruments intended for the measurement of methane in the Earth's atmosphere
- Active remote sensing optical instruments (lidar)

Non-NASA Applications

- Remote gas sensing.
- Range-finding and lidar applications
- Commercial wind lidar systems
- Telecom systems
- Medical systems

Firm Contacts

Mark Itzler
Princeton Lightwave, Inc.
2555 Route 130 South, Suite 1
Cranbury, NJ, 08512-3509
PHONE: (609) 495-2600